

We claim:

1. A method of treating snoring comprising:
  - a) monitoring the airway passage of a patient during sleep to identify at least one anatomical structure in the airway passage that vibrates during snoring;
  - b) implanting at least one microstimulator in the proximity of the at least one anatomical structure identified in step a);
  - c) energizing the microstimulator to deliver an electrical stimulation to the anatomical structure to cause at least one muscle to contract and reduce the vibrations of the airway passage.
2. The method of claim 1, further including inserting a distal end of a scope such that the distal end is located in an upper airway of the patient and monitoring the airway passage during sleep.
3. The method of claim 1, further including inserting a distal tip of an insertion tool into the anatomical structure, wherein the microstimulator is located in a lumen of the insertion tool, and activating the insertion tool to eject the microstimulator from the insertion tool, and removing the insertion tool from the anatomical structure.
4. The method of claim 1, further comprising delivering an electrical stimulation to the anatomical structure prior to step b), and observing the anatomical structure for decrease in vibration.
5. The method of claim 4, further comprising inserting a distal tip of an insertion tool into an anatomical structure, applying an electrical current to at least the distal tip of the insertion tool, and delivering an electrical current to the anatomical structure.
6. The method of claim 4, further including inserting a distal tip of an insertion tool into the anatomical structure, wherein the microstimulator is located in a lumen of

the insertion tool, and energizing the microstimulator located within the lumen of an insertion tool.

7. The method of claim 1, further comprising testing the microstimulator by emitting electrical stimulations at a plurality of intensities, and observing the anatomical structure to determine the intensity which decreases the vibration of the anatomical structure.

8. The method of claim 7, wherein the electrical stimulation is of an intensity from about 8 to about 800 nC.

9. The method of claim 1, further comprising energizing the microstimulator at a selected frequency to deliver an electrical stimulation to the anatomical structure to cause at least one muscle to contract and reduce the vibrations of the airway passage.

10. The method of claim 9, wherein the frequency is about 1 to about 30 pulses per second.

11. The method of claim 9, further comprising providing interruptions of a selected duration and period in the electrical stimulation to permit the at least one muscle to relax.

12. The method of claim 11 wherein the duration of the interruption is from about 0.2 to about 2 seconds and the selected period is from about 5 to about 20 seconds.

13. The method of claim 1, further comprising:

- a) sensing when snoring is occurring; and
- b) generating an electrical stimulus from the microstimulator to contract an oropharyngeal muscle, in response to sensing snoring in step a).

14. The method of claim 13, wherein snoring is sensed by detecting mechanical vibrations of at least one anatomical structure.
15. The method of claim 13, wherein snoring is sensed by acoustically detecting sounds generated by vibrating at least one anatomical structure in the airway passages.
16. The method of claim 1, wherein the energizing includes delivering a control signal to a pair of electrodes, wherein the microstimulator includes the pair of electrodes.
17. The method of claim 1, wherein the anatomical structure is selected from the group comprising: the soft palate or the uvula.
18. The method of claim 1, wherein the anatomical structure is a muscle selected from the group comprising: palatoglossus, palatopharyngeal, musculus uvulae, genioglossus, geniohyoid, levator palati or tensor palati.
19. The method of claim 1, wherein the anatomical structure is a branch or terminal of a nerve selected from the group comprising: vagus X, hypoglossal, vagus pharyngeal branch, V3 branch trigeminal nerve.
20. The method of claim 1, further comprising implanting a second microstimulator proximate to at least a second anatomical structure, different than the at least one anatomical structure.
21. The method of claim 20, wherein at least one anatomical structure and a second anatomical structure are muscle pairs selected from the group comprising:

geniohyoid and genioglossus; tensor palati and palatoglossus; tensor palati and musculus uvulae.

22. The method of claim 20, wherein at least one of the microstimulators includes a sensor and a telemeter configured to generate a signal indicative of a sensed condition, and at least one of the microstimulators includes a circuitry configured to generate an electrical stimulation pulse.

23. The method of treating snoring comprising:

a) implanting a microstimulator within at least one of the soft palate or the uvula; and

b) activating the microstimulator to deliver an electrical stimulation to at least one of the soft palate or the uvula to cause at least one muscle to contract.

24. The method of claim 23, wherein the microstimulator includes an electrical circuit configured to generate an electrical stimulus and a pair of electrodes configured to apply the electrical stimulus to the at least one of the soft palate or uvula.

25. The method of claim 23, further comprising transmitting from a controller to the microstimulator power, control signals, or power and control signals.

26. The method of claim 23, further comprising transmitting an acknowledgement signal from the microstimulator to a controller, wherein the acknowledgement signal indicates that the microstimulator has received a control signal from a controller.

27. The method of claim 23, further comprising activating the microstimulator in a temporal pattern to deliver the electrical stimulation to the at least one of the soft palate or the uvula to cause at least one muscle to contract, wherein the temporal pattern includes periods of an absence of electrical stimulation to permit the at least one muscle to cease from contracting.

28. The method of claim 23, further comprising testing the microstimulator by emitting electrical stimulations at a plurality of intensities, and observing at least one of the uvula or soft palate to determine the intensity which decreases the vibration of the uvula or soft palate.

29. The method of claim 28, wherein the electrical stimulation is of an intensity from about 8 to about 800 nC.

30. The method of claim 23, further comprising sensing when snoring is occurring; and electrically stimulating at least one microstimulator implanted within the soft palate or the uvula in response to sensing snoring.

31. The method of claim 30, wherein snoring is sensed by detecting mechanical vibrations of at least on anatomical structure.

32. The method of claim 30, wherein snoring is sensed by acoustically detecting sounds generated by at least one vibrating anatomical structure in the airway passages.

33. The method of claim 23, wherein the microstimulator is implanted in a muscle selected from the group comprising: palatoglossus, palatopharyngeal, or musculus uvulae.

34. The method of claim 23, wherein the microstimulator is implanted proximate to a branch or terminal of the vagus X nerve.

35. The method of claim 23 further comprising implanting a second microstimulator in the proximity of an anatomical structure selected from the group comprising: palatoglossus, palatopharyngeal, musculus uvulae, genioglossus,

geniohyoid, levator palate, tensor palati, vagus X, hypoglossal, vagus pharyngeal branch, V3 branch trigeminal nerve.

36. The method of claim 23, further comprising:

- a) inserting a distal tip of an insertion tool including a microstimulator through the oral mucosa of the soft palate;
- b) inserting the distal tip of the insertion tool into the uvula;
- c) activating the insertion tool to deposit the microstimulator from the insertion tool; and
- d) removing the insertion tool from the uvula.

37. The method of claim 36, further including positioning the microstimulator in or in the proximity of the musculus uvulae.

38. The method of claim 36, further including positioning the microstimulator in the proximity of the terminal branches of the motor axons to the musculus uvulae, wherein the microstimulator includes a cathode and an anode; and positioning the microstimulator cathode in the proximity of the terminal branches of the motor axons to the musculus uvulae.

39. The method of claim 36, further comprising advancing a distal tip of an insertion tool through the oral mucosa to the soft palate to the uvula, wherein the distal tip of the insertion tool includes a microstimulator within a lumen of the distal tip; and testing microstimulator by emitting electrical stimulation from the microstimulator within the lumen of the distal tip; and withdrawing the insertion tool leaving the microstimulator within the uvula.

40. The method of implanting a microstimulator into the genioglossus muscle comprising:

- a) inserting a distal tip of an insertion tool through the epidermis under the mandible

- b) passing the distal tip of the insertion tool through the geniohyoid muscle;
- c) inserting the distal tip of the insertion tool into the genioglossus muscle;
- d) depositing the microstimulator in the genioglossus muscle; and
- e) removing the insertion tool from the body.

41. The method of claim 40, further including positioning the microstimulator in the proximity of the endplate zone of the radially oriented sagittal muscle fibers of the genioglossus muscle, wherein the microstimulator includes a cathode and an anode; and positioning the microstimulator cathode in the proximity of the endplate zone of the radially oriented sagittal muscle fibers of the genioglossus muscle.

42. The method of claim 40, further comprising advancing a distal tip of an insertion tool through the geniohyoid muscle to the genioglossus muscle, wherein the distal tip of the insertion tool includes a microstimulator within a lumen of the distal tip; and testing microstimulator by emitting electrical stimulation from the microstimulator within the lumen of the distal tip; and withdrawing the insertion tool leaving the microstimulator within the genioglossus.

43. The method treating snoring in a patient comprising alternately stimulating at least a first and second muscle in the oropharynx to contract so that an airway passage remain substantially free of vibrating soft tissue during sleep.

44. The method treating snoring in a patient comprising alternately stimulating at least a first and second muscle in the oropharynx to contract so that an airway passage remains substantially free of vibrating soft tissue during sleep, and selecting a pattern of stimulation such that while the first muscle is being contracted the second muscle may have a period of relaxation, and while the second muscle is being contracted, the first muscle may have a period of relaxation.

45. The method of claim 43 wherein the first and second muscles are selected from the group comprising: palatoglossus, palatopharyngeal, musculus uvulae, genioglossus, geniohyoid, levator palati, tensor palati.

46. The method of claim 43, wherein the first and second muscles are selected from the groups of pairs comprising: tensor palati and palatoglossus; tensor palati and musculus uvulae; and geniohyoid and genioglossus.

47. The method of claim 43, further comprising monitoring an airway passage of the patient during sleep to identify at least one anatomical structure in the airway passage that vibrates during snoring.

48. The method of claim 43, further comprising:

- a) sensing when snoring is occurring; and
- b) generating an electrical stimulus from the microstimulator to contract an oropharyngeal muscle, in response to sensing snoring in step a).

49. The method of claim 48, wherein snoring is sensed by detecting mechanical vibrations of at least one anatomical structure.

50. The method of claim 48, wherein snoring is sensed by acoustically detecting sounds generated by at least one vibrating anatomical structure in the airway passages.

51. The method of claim 48, further including implanting at least a first microstimulator and a second microstimulator, and wherein the first and second microstimulators are alternately activated to cause the contraction of the at least first and second muscle in the oropharynx



52. The method of claim 51, further comprising alternately applying electrical stimulations of an intensity from about 8 to about 800 nC to stimulate at least the first and second muscle in the oropharynx to contract.

53. The method of claim 43, further comprising applying electrical stimulations for a selected duration to stimulate at least the first muscle in the oropharynx to contract, and interrupting the electrical stimulation for a selected duration at a selected period to permit the first muscle in the oropharynx to relax.